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ABSTRACT

The role of imagery formation as a mnemonic device in drawing valid inferences from a prose passage was studied. The 72 undergraduate subjects were divided into two groups: one given instructions to form images for the objects discussed in the text, the other given instructions to repeat each sentence five times. Half the passages consisted of scrambled sequences of statements, half consisted of logically ordered sequences. Thus the effectiveness of imagery formation was compared to the effectiveness of rote learning. A test consisting of eight valid and eight invalid statements was given, and the subjects were asked to discern the valid and invalid statements. It was found (1) that the logical-sequence group performed better than the scrambled-sequence group and (2) that the imagery group's performance was better on both the logical sequence and the scrambled sequence. It was concluded that imagery formation can play an important role in developing reading comprehension. Tables and references are included. (AL)

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THE EFFECTS OF IMAGERY AND ROTE REPETITION INSTRUCTIONS ON THE ABILITY TO REASON FROM LOGICAL AND SCRAMBLED SEQUENCES

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In an earlier study (Natkin and Moore, 1971) of the effect of instructional sequencing subjects were required to learn the meanings of sequentially defined nonsense syllables. The task was structured so that in one sentence a syllable was defined, and in successive sentences new terms were defined by modifying the earlier terms. For example, the syllable "BAF" was defined as meaning "green house", then "LOZ" was defined as "large BAF", etc. Subjects, after reading a series of such sentences, were required to define each of the terms. The sentences were presented either in order, from the first defined term, or scrambled sequences.

There were two results of interest in this study. (1) subjects studying logical sequences did perform better on the post-test than did subjects studying scrambled sequences. (2) this superiority resulted from the logical subjects being more frequently able to give correct responses after

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errors on structurally lower level items. This last result indicated that these subjects had managed to store and retrieve some of the information independently of the lower level items, so that a memory failure on an earlier part of the sequence did not necessarily damage later recall. The scrambled subjects could not use such a technique very well, since they could not determine the meaning of each syllable as it was presented. Therefore, a failure at any level resulted in failure on all succeeding levels for them.

It was conjectured, then, that logical sequencing was effective primarily because it reduces memory requirements in structured tasks. As a corrolary, sequencing should make less difference if learner's studying scrambled sequences were able to retain most or all of the information needed to unscramble or re-organize the text. The present study was designed to test that hypothesis in the context of prose material.

Recent research in mental imagery and verbal learning provided evidence that imagery can provide a powerful tool for facilitating recall. Bugelski, Kidd, and Segmen (1968), Johnson (1970), and Bugelski (1968) all found recall facilitated when subjects were instructed to learn the ordinal positions of words in word lists by using imagery to associate the words with an already memorized device, consisting of the numbers one through ten, each of which was paired with a rhyming peg word. Too, there is evidence that

visual imagery can play a more direct role in reasoning by allowing subjects to read off relationships among logical elements rather directly, in the way that spatial relationships are read off a map (Handel, DeSoto, and Hudson, 1968; Huttenlocher, 1968).

Imagery, then, should have important effects on learning and recall from logical structures for two reasons; (1) it should facilitate recall of the elements of the structure, which earlier research suggests is an important condition for re-organization; (2) it should facilitate the re-organization process directly, by clarifying the relationships among logical elements. The following study attempts to test this hypothesis.

Method

Subjects

The subjects were seventy-two Bucknell University undergraduates, both males and females, enrolled in an undegraduate Social Foundations course, Spring Semester, 1971. Participation was mandatory.

Materials

The materials were adapted from logically structured passages developed by Frase (1969). Five such passages were developed, all of which allow for the specification of the passage's inferential structures, the statements which were logically implied by statements made in the passages.

Each subject received a pre-assembled packet of materials, which included either rote repetition or imagery in-

structions, five scrambled or logically ordered prose passages, one set of sixteen test statements for each of the passages, and an answer sheet for the test statements.

The imagery instructions directed the subject to form mental images of the objects discussed in the text, adding new information to the images as it was received. Rote repetition instructions told the subject to repeat each of the sentences five times before going to the next one. Rote instructions were employed to prevent these subjects from spontaneously forming images. Each sentence of each paragraph was presented on a separate page of the booklet, in order to prevent subjects from reading ahead.

The test statements for each paragraph consisted of eight valid and eight invalid inferences which could be drawn from the passages. Subjects were required to indicate whether the inference was true or false.

Passages within booklets were randomly ordered.

Procedure

The experiment was conduceted during a regularly scheduled class period. All groups were run at the same time. The experimenter explained that this was a study of reading styles. The packets of materials were ordered at random, according to treatment combinations, and distributed to the subjects. The experimenter emphasized the importance of following instructions carefully. No time

limit was imposed, since both repetition and the forming of images may require considerable time.

Design

The design was a 2 X 2 X 5 factorial, with repeated measures on the last variable. There were two types of instructions, two of sequence, and five passages.

Results

Scores on the inference tests were analyzed by a 2 X 2 X 2 repeated measures ANOVA. Results for the second and third passages were pooled, as were those for the fourth and fifth, in order to compensate for the large guessing variance component inherent in true-false tests. The first trial was considered a warm-up, and not included in the analysis.

The only significant between-subjects effect was that for sequences ($F = 15.21$, $p < .01$), favoring logical sequences. There were two significant within-subject effects: instructions X trials ($F = 4.427$, $p < .05$) and instructions X sequence X trials ($F = 6.430$, $p < .01$). The results are shown in fig. 1. As the figure shows, the imagery group performed better on all trials within the logical sequences. Within the scrambled sequences the imagery group performed less well on the first block, but exceeded the rote group on the second block.

Discussion

These results confirm those of Frase (1970) and Natkin and Moore (1971) in demonstrating a sequence effect for

material with a unique logical structure.

More important, however, the data confirm the prediction that subjects using imagery as a mnemonic device would perform better than those not using such a technique. An interesting feature of the results, one which might have been anticipated, is that scrambled-imagery subjects improved over trial blocks, bhile scrambled-rote subjects got worse. Fatigue or proactive interference may explain the results for S-R, but it seems likely that S-I results represent a learning to learn phenomenon. These subjects, we conjecture, were learning to use the imagery-integration technique over the five passages; with enough practice the succeeded well enough to approach the scores of the logical subjects on the second trial block.

Practically speaking, the data lead to the conjecture that the purposeful use of imagery may come to play an important role in the development of reading comprehension. If readers can quickly form composit images to accurately represent what they read, both recall and reasoning from text might be greatly facilitated.

REFERENCES

Bugelski, B. R. Images as a mediator in one-trial paired associate learning. II: Self-timing in successive lists. Journal of Experimental Psychology, 1968, 77, 328-334.

Bugelski, B. R., Kidd, E., and Segmen, J. The image as a mediator in one-trial paired-associate learning. Journal of Experimental Psychology, 1968, 76, 69-73.

Frase, L. T. Structural analysis of the knowledge that results from thinking about text. Journal of Educational Psychology, 1969, 60, (6, pt. 2)

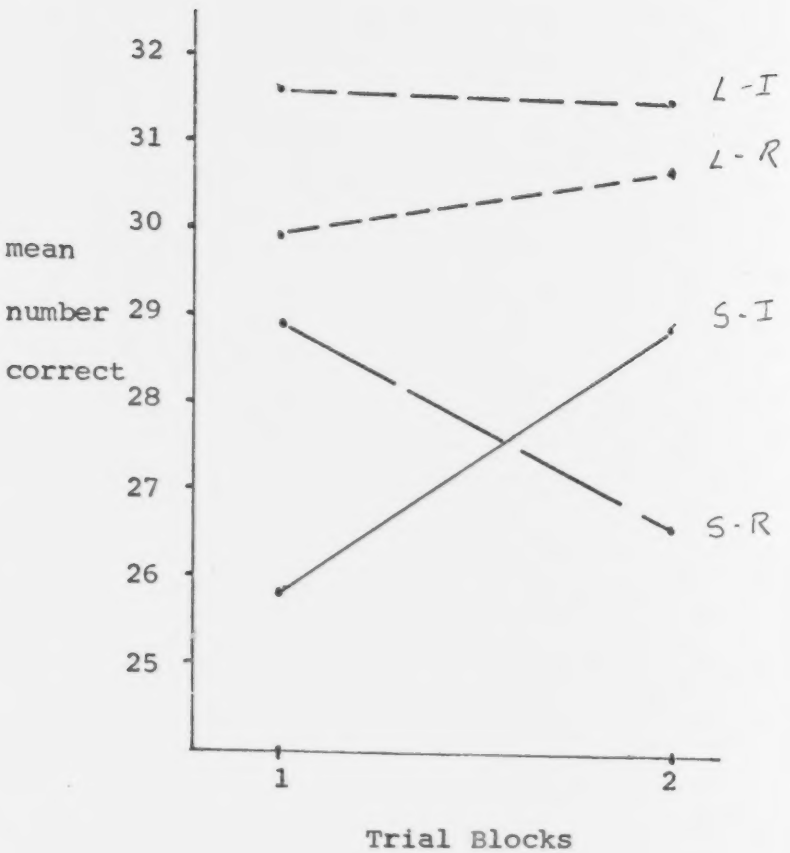
Handel, S., DeSoto, C.B., and London, M. Reasoning and spatial representations. Journal of Verbal Learning and Verbal Behavior, 1968, 7, 351-357.

Huttenlocher, J. Constructing spatial images: a strategy in reasoning. Psychological Review, 1968, 75, 550-560.

Johnson, R. B. Images as mediators in free recall. Journal of Experimental Psychology, 1970, 84, 523-526.

Natkin, G. L., and Moore, J. W. The effects of instructional sequencing on learning from a simple knowledge hierarchy. Paper presented at the annual meetings of the American Educational Research Association, 1971.

Figure 1.


32
31
30
29
28
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26
25
mean
number
correct
L-I
L-R
S-I
S-R
1
2
Trial Blocks